WHAT IS CLAIMED IS:

1. A method for sampling a signal comprising:

matching the signal to a first receive pulse shape;

matching the signal to a second receive pulse shape;

sampling outputs from the first and second matching; and

creating an output signal from the sampled outputs.

2. The method of claim 1, wherein the first and the second receive pulse shapes are essentially equal, and wherein the first receive pulse shape has been advanced a first time offset and the second received pulse shape has been retarded a second time offset.

3. The method of claim 2, wherein the first time offset and the second time offset are essentially equal.

4. The method of claim 2, wherein the first and the second time offsets can be determined from characteristics of the signal.

5. The method of claim 2, wherein the first and the second time offsets can be determined adaptively.

6. The method of claim 1, wherein the sampling occurs at the same time for each output.

7. The method of claim 6, wherein the sampling occurs at a sampling rate that can be determined from expected characteristics of the signal.

8. The method of claim 1, wherein the creating comprises adding the sampled outputs together.

9. The method of claim 8, wherein samples from each output are multiplied by a weighting factor prior to the adding.

10. The method of claim 9, wherein the weighting factor is the same for all samples from an output.

11. The method of claim 9, wherein the weighting factor can be different for each output.

12. The method of claim 1, wherein the creating comprises combining the outputs in a tapped-delay line fashion.

13. The method of claim 12, wherein the output signal can be expressed as:

$$\mathrm{Re}[\sum_{k=0}^{L-1}\{\alpha(k)-j\beta(k)\}y(n-k)]=\sum_{k=0}^{L-1}\{\alpha(k)y_i(n-k)+\beta(k)y_q(n-k)\},$$

wherein the output signal is real-valued, α and β are weighting factors, $y_i(n)$ and $y_q(n)$ are the outputs, and $y(n)$ is equal to $y_i(n) + y_q(n)$, and L is the length of the tapped-delay line.

14. A method for reducing receiver sensitivity to sample timing errors comprising:

matching a received signal to a first received pulse shape, wherein the first received pulse shape is a representation of a pulse carried in the received signal;

matching the received signal to a second received pulse shape, wherein the second received pulse shape is a representation of the pulse carried in the received signal;

sampling outputs from the first and second matching; and

combining the samples to create an output signal.

15. The method of claim 14, wherein the first received pulse shape is advanced by a first time offset and the second received pulse shape is retarded by a second time offset.

16. The method of claim 15, wherein the first and the second time offsets are essentially equal.

17. The method of claim 15, wherein the first and the second time offsets can be chosen based upon an auto-correlation function of the pulse.

18. The method of claim 15, wherein the first and the second time offsets can be chosen adaptively.

19. The method of claim 14, wherein in an additive white Gaussian noise situation, the outputs can be combined by addition.

20. The method of claim 19, wherein the samples from one output are multiplied by a first weighting factor and the samples from the other output are multiplied by a second weighting factor prior to the addition.

21. The method of claim 14, wherein in a multipath situation, the outputs can be combined in a tapped-delay line fashion.

22. The method of claim 21, wherein the combining can be expressed as:

$$\mathrm{Re}[\sum_{k=0}^{L-1}\{\alpha(k)-j\beta(k)\}y(n-k)]=\sum_{k=0}^{L-1}\{\alpha(k)y_i(n-k)+\beta(k)y_q(n-k)\}$$

wherein the output signal is real-valued, α and β are weighting factors, $y_i(n)$ and $y_q(n)$ are the outputs, and $y(n)$ is equal to $y_i(n) + y_q(n)$, and L is the length of the tapped-delay line.

23. The method of claim 21, wherein the combining further comprises equalizing the samples.

24. The method of claim 23, wherein the equalizing implements an equalizer of a type selected from a group consisting of a decision feedback equalizer (DFE), a reduced-state sequence estimator (RSSE), a maximum-likelihood sequence estimator (MLSE) or combinations thereof.

25. The method of claim 14 further comprising after the combining, adjusting sample timing.

26. The method of claim 25, wherein the adjusting comprises:

comparing an early, on-time, and late sampling of a sample; and

setting the sample timing to the sampling of a largest value.

27. The method of claim 25 further comprising despreading the samples prior to the adjusting.

28. The method of claim 25 further comprising despreading the samples after the adjusting.

29. A circuit comprising:

a first matched filter coupled to a signal input, the first matched filter containing circuitry to compare a pulse provided by the signal input to a first receive pulse shape and to provide an output sample based upon the comparison; and

a second matched filter coupled to the signal input, the second matched filter containing circuitry to compare a pulse provided by the signal input to a second receive pulse shape and to provide an output sample based upon the comparison.

30. The circuit of claim 29 further comprising an equalizer coupled to the first and the second matched filters, the equalizer containing circuitry to combine samples produced by the first and the second matched filters to produce an output signal.

31. The circuit of claim 29, wherein each matched filter comprises:

a multiplier to multiply the pulse with a receive pulse shape;

an integrator coupled to the multiplier, the integrator to accumulate a value from an output produced by the multiplier; and

a sampler coupled to the integrator, the sampler to periodically create a sample based upon the accumulated value from the integrator.

32. The circuit of claim 31, wherein the sampler is a switch that periodically closes to produce a sample.

33. The circuit of claim 32, wherein the period is based upon a frequency of the pulses provided by the signal input.

34. The circuit of claim 33, wherein the period is further based upon a data rate of information carried in the pulses provided by the signal input.

35. The circuit of claim 29, wherein the first receive pulse shape is an advanced version of the pulse and the second receive pulse shape is a retarded version of the pulse.

36. A receiver comprising:

a band select filter coupled to a signal input, the band select filter containing circuitry to selectively pass a portion of a frequency band from a signal provided by the signal input;

an amplifier coupled to the band select filter, the amplifier to bring an output of the band select filter to a desired level;

a first matched filter coupled to the amplifier, the first matched filter containing circuitry to compare a pulse provided by the amplifier to a first receive pulse shape and to provide an output sample based upon the comparison;

a second matched filter coupled to the amplifier, the first matched filter containing circuitry to compare a pulse provided by the amplifier to a second receive pulse shape and to provide an output sample based upon the comparison; and

a decoder coupled to the first and the second matched filters, the decoder containing circuitry to detect and eliminate errors that may be present in the outputs produced by the first and the second matched filters.

37. The receiver of claim 36, wherein the receiver operates in a wireless communications network.

38. The receiver of claim 37, wherein the wireless communications network is an ultra-wideband communications network.

39. The receiver of claim 38, wherein the wireless communications network is a carrier-less ultra-wideband communications network.

40. The receiver of claim 38, wherein the wireless communications network is a wavelet-based ultra-wideband communications network.

41. The receiver of claim 36 further comprising an equalizer coupled to the first and the second matched filters, the equalizer containing circuitry to combine samples produced by the first and the second matched filters to produce an output signal.

42. The receiver of claim 36 further comprising a despreader having inputs coupled to the first and second matched filter and an output coupled to the equalizer, the despreader containing circuitry to remove a spreading code that is present in the signal.

43. The receiver of claim 36 further comprising:

a despreader having inputs coupled to the first and second matched filter and an output coupled to the equalizer, the despreader containing circuitry to remove a spreading code that is present in the signal; and

an equalizer coupled to the despreader, the equalizer containing circuitry to combine an output produced by the despreaders to produce an output signal.